890

AUTOMATIC STRIP READING Ddensitometer

Operation Manual

x-rite

Dear Customer:

Congratulations! We at X-Rite, Incorporated are proud to present you with X-Rite 890 Auto Strip Reading, Color Photographic Densitometer. This instrument represents the very latest in microcontrollers, integrated circuits, optics, and display technology. As a result, your X-Rite instrument is a rugged and reliable instrument whose performance and design exhibit the qualities of a finely engineered instrument, which is not surpassed.

To fully appreciate and protect your investment, we suggest that you take the necessary time to read and fully understand this manual. As always, X-Rite stands behind your instrument with a one year limited warranty, and a dedicated service organization. If the need arises, please don't hesitate to call us.

Thank you for your trust and confidence.

X-Rite, Incorporated

FCC
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Canada
This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

NOTE: Shielded interface cables must be used in order to maintain compliance with the desired FCC and European emission requirements.

CAUTION: Operational hazard exists if AC adapter other than X-Rite SE30-77 (100-240V) is used.

VORSICHT: Betriebsgefahr besteht bei Gebrauch von anderen Adaptern als X-Rite SE30-77 (100-240 V).

AVISO: No use otro adaptador C.A. que no sea la pieza X-Rite SE30-77 (100-240V), por el riesgo de mal funcionamiento del equipo.

ATTENTION: Ne pas utiliser d'adaptateur autre que SE30-77 (100-240V) de X-Rite au risque de mauvais fonctionnement de l'appareil.

AVVISO: Non usare un altro adattatore C.A. che non è del pezzo X-Rite SE30-77 (100-240V), per il rischio di malfunzionamento dell'apparecchio.

The Manufacturer: Der Hersteller: El fabricante: Le fabricant: Il fabbricante:	**X-Rite, Incorporated** **4300 44th Street, S.E.** **Grand Rapids, Michigan 49512**
Declares that: gibt bekannt: advierte que: avertit que: avverte che:	**Densitometer** **890**

is not intended to be connected to a public telecommunications network.
an ein öffentliches Telekommunikations-Netzwerk nicht angeschlossen werden soll.
no debe ser conectado a redes de telecomunicaciones públicas.
ne doit pas être relié à un réseau de télécommunication publique.
non deve essere connettuto a reti di telecomunicazioni pubblici.

CE DECLARATION

Manufacturer's Name:	X-Rite, Incorporated
Manufacturer's Address:	4300 44th Street, S.E. Grand Rapids, Michigan 49512 U.S.A.
Model Name:	Densitometer
Model No.:	890
Directive(s) Conformance:	EMC 89/336/EEC LVD 73/23/EEC

WEEE

As of August 13, 2005, X-Rite products meet the European Union – Waste Electrical and Electronic Equipment (WEEE) directive. Please refer to www.xrite.com for more information on X-Rite's compliance with the WEEE directive.

Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

PROPRIETARY NOTICE

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This instrument may be covered by one or more patents. Refer to the instrument for actual patent numbers.

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LIMITED WARRANTY

X-Rite, Incorporated (“X-Rite”) warrants each instrument manufactured to be free of defects in material and workmanship (excluding battery pack) for a period of 12 months. This warranty shall be fulfilled by the repair or replacement, at the option of X-Rite, of any part or parts, free of charge including labor, F.O.B. its factory or authorized service center.

This warranty shall be voided by any repair, alteration, or modification, by persons other than employees of X-Rite, or those expressly authorized by X-Rite to perform repairs, and by any abuse, misuse, or neglect of the product, or by use not in accordance with X-Rite’s published instructions.

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This agreement shall be interpreted in accordance with the laws of the State of Michigan and jurisdiction and venue shall lie with the courts of Michigan as selected by X-Rite, Incorporated..

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SECTION ONE

Getting Started

This section covers unpacking, inspection, and general set up of your instrument. Product description, paper guide adjustments, and measurement techniques are also include.

Section One Contents

- Unpacking and Inspection
- Product Description
- Applying Power
- User Interface
- Adjusting the Paper Guides
- Strip Measurement Techniques

UNPACKING AND INSPECTION

After removing the instrument from the shipping carton, inspect for possible damage. If any damage occurred during shipping, immediately contact the transportation company. Do not proceed with installation until the carrier's agent has inspected the damage.

Your instrument was packaged in a specially designed carton to assure against damage. If reshipment is necessary, the instrument should be packaged in the original carton. If the original carton is not available, contact X-Rite to have a replacement shipped to you.

Packaging Drawing and Parts List

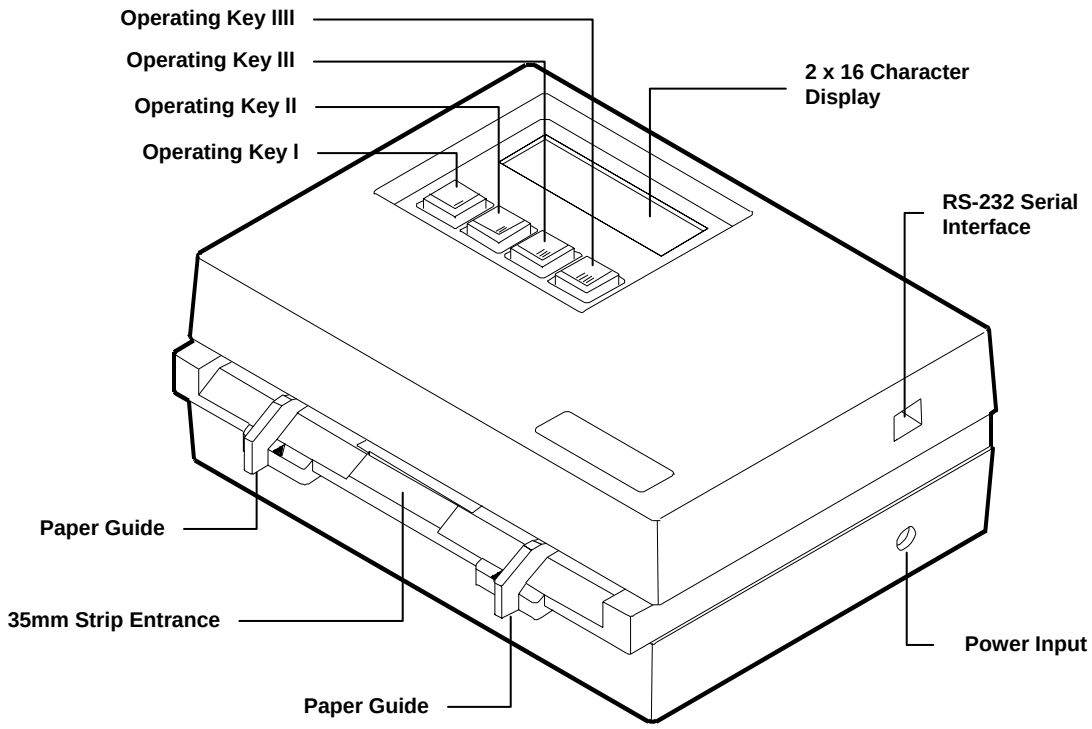
Check your packaging contents against your packing list and your original order. Detailed packaging drawing and parts list is included in this manual as *Appendix D.*

PRODUCT DESCRIPTION

The X-Rite 890 automated instruments measures paper, film, and printer balance control strips. Simply insert the strip into the instrument for motorized, automatic measurements. Red, green, and blue density data is sorted for fields such as HD, LD, and Stain, then simultaneously displayed and transmitted to a minilab printer for analysis.

To accommodate the different size control strips, the instrument has adjustable paper guides on each side of the control strip entrance. Adjustment is made by simply sliding the paper guides to the settings displayed for the selected strip.

The instrument communicates through a standard RS-232 interface. If you wish to remotely control your instrument, you must use the remote control interface protocol discussed in the RS-232 Interface Manual—available from X-Rite, Incorporated.

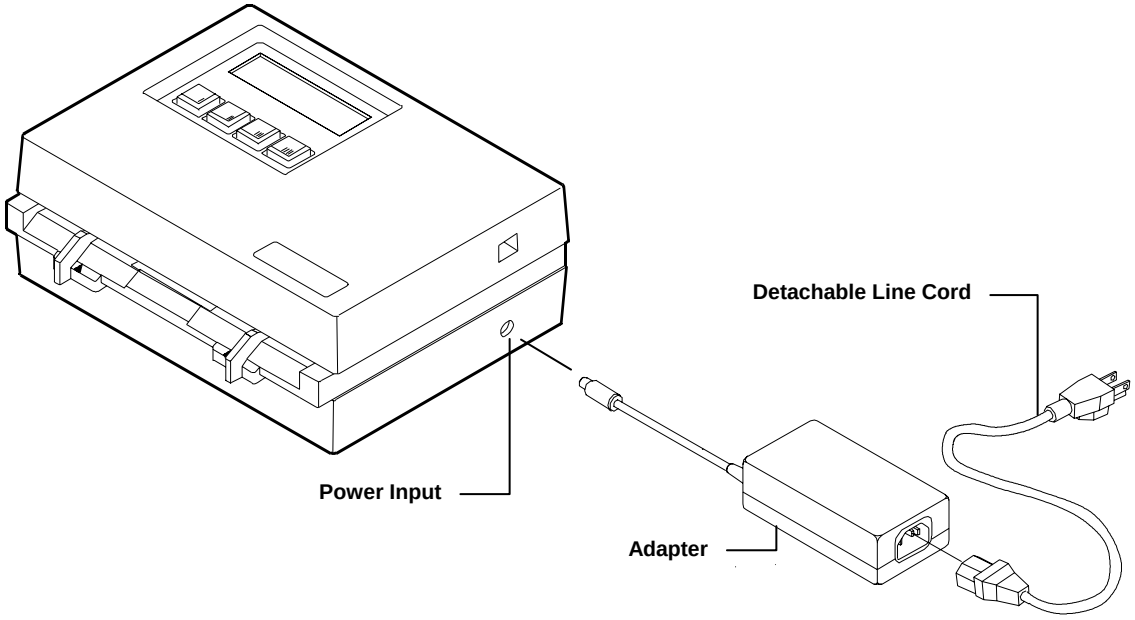


APPLYING POWER

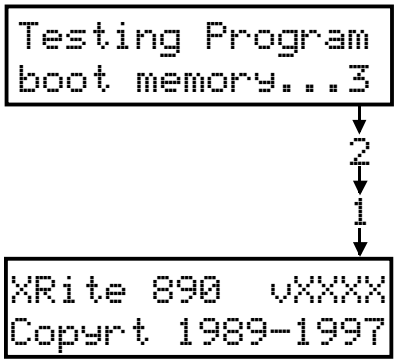
To apply power to the instrument:

1. Verify that the voltage indicated on the adapter complies with the AC line voltage in your area. If not, contact X-Rite or your authorized representative.
2. Insert the small plug from the adapter into the power-input connector on the instrument.
3. Plug the detachable line cord into the adapter.
4. Plug the line cord into an AC wall receptacle.

IMPORTANT: To extend the life of the internal memory battery, it is recommended that the instrument remain plugged into AC power. If you are using a modem, AC power must be applied in order to transmit or receive data.



At initial power-up, the instrument performs a “boot memory test.” The testing sequence is displayed on the instrument screen. If all internal tests are OK, Page 1 Main Menu displays—see next page.



USER INTERFACE

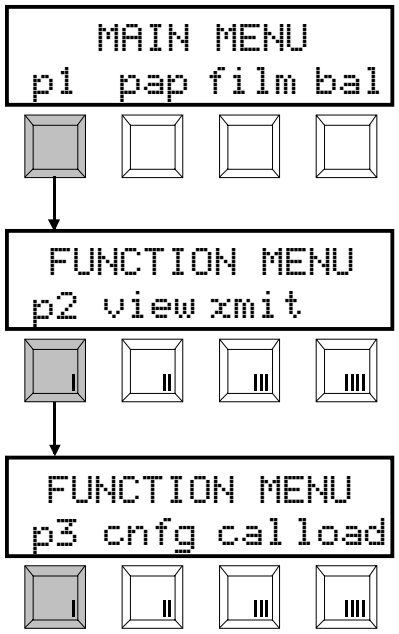
The 890 instrument incorporates a three page menu system. Menu pages are displayed by continually pressing keyswitch **l** (p#) on the instrument. The first page contains all the predefined control strips. The last two pages provide access to the instrument setup options and strip measurement data.

Main Menu

- **pap** (paper) - accesses the paper measurement channel. The format selected remains selected until changed.
- **film** - access the film measurement channel. The format selected remains selected until changed.
- **bal** (printer balance) - accesses the printer balance measurement channel. The format selected remains selected until changed.

Function Menus

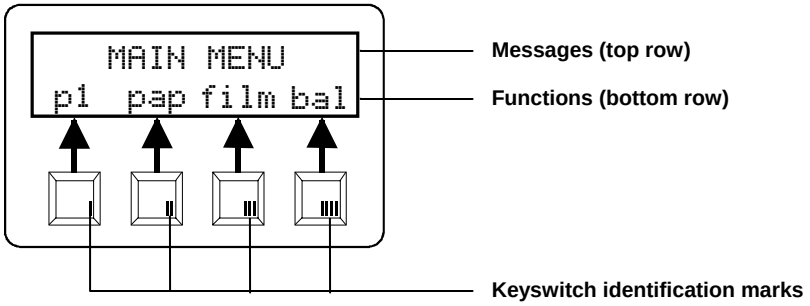
- **view** - used to view data of the last strip measured.
- **xmit** (transmit)- used to manually transmit data of the last strip measured—via RS-232 port.
- **cal** (calibration) - used for calibration.
- **cnfg** (configuration) - used to access system configuration options.
- **load** - for updating the instrument's firmware (see Appendix E).



Display and Keyswitch Definition

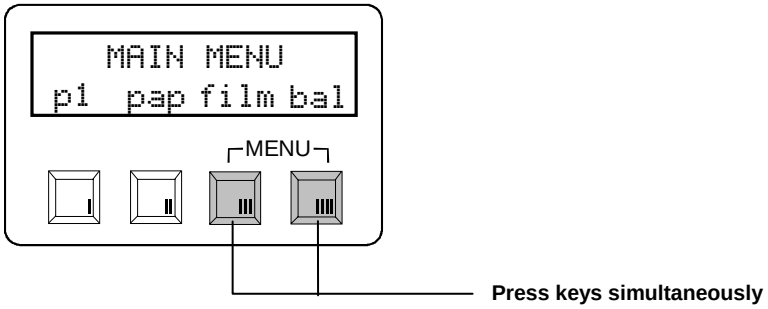
The characters in the bottom row of the display dictate which function is selected or which action takes place when a corresponding keyswitch is pressed. Normally, upper-case lettering in the top row of the display is used for messages, and lower-case lettering in the bottom row is used for menu options that are selectable.

Each keyswitch is embossed with identification marks signifying its number. The left-most key is labeled "**I**", center-left key is labeled "**II**", and so on. Keyswitches that are used to select a function or perform an action are tinted (grayed) throughout this manual.



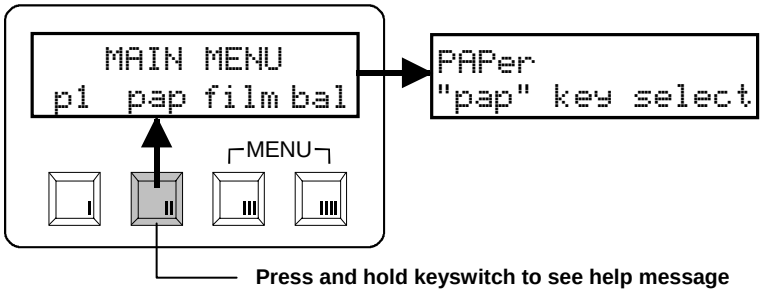
Menu Keys

Keyswitch **III** and **IIII** have the word "MENU" printed above them. Pressing these two keys simultaneously at any location in the menu structure causes the display to return to page 1 of the main menu.



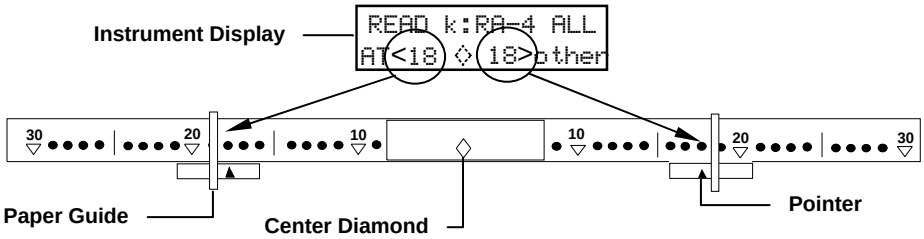
Help Messages

Built-in help messages are available for most functions. Help messages are activated by pressing and holding down a key until the message appears. To temporarily pause a message, press the key again.

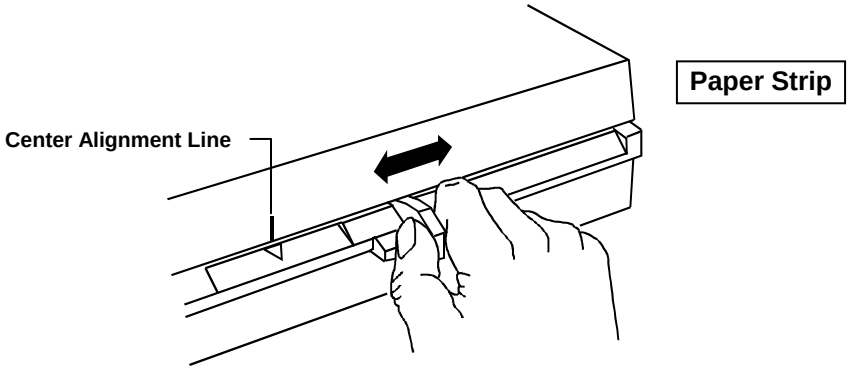


ADJUSTING THE PAPER GUIDES

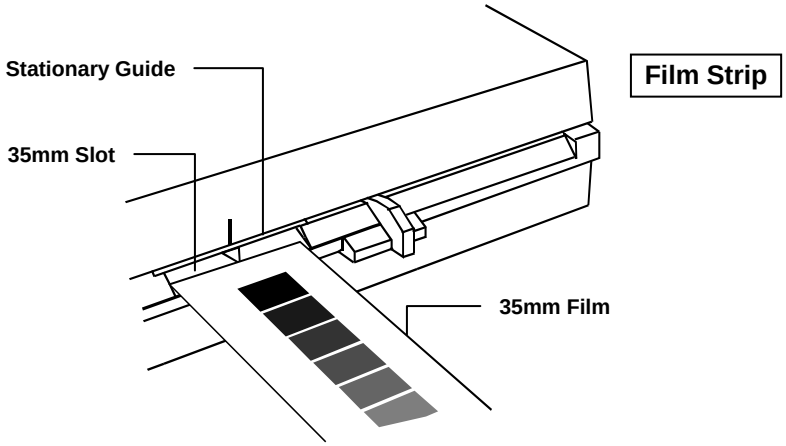
To accommodate various size paper strips, the instrument has an adjustable paper guide on each side of the strip entrance. Each paper guide has a pointer (triangle) that is aligned with a number on the guide rail. The guide setting numbers are shown on the instrument display when a paper strip is selected. The paper guide rail has setting marks that range from “9-30” to the left and right of the center diamond. Each mark (stop) is 1/10” increment—10 stops equal one inch. The instrument automatically displays the proper guides settings for the selected strip (see below).



The paper guides are moved by sliding them to the left or right.



To accommodate 35mm wide strips, the instrument has a special stationary guide located above the diamond



STRIP MEASUREMENT TECHNIQUES

All control strip types should have at least a 30.5mm (1.25”) leader before the first measurable patch. However, strips with less than a 30.5mm leader can also be measured reliably if required. Refer to your Control Strip and Balance Print Format Guide for leaderless strip measurement procedure.

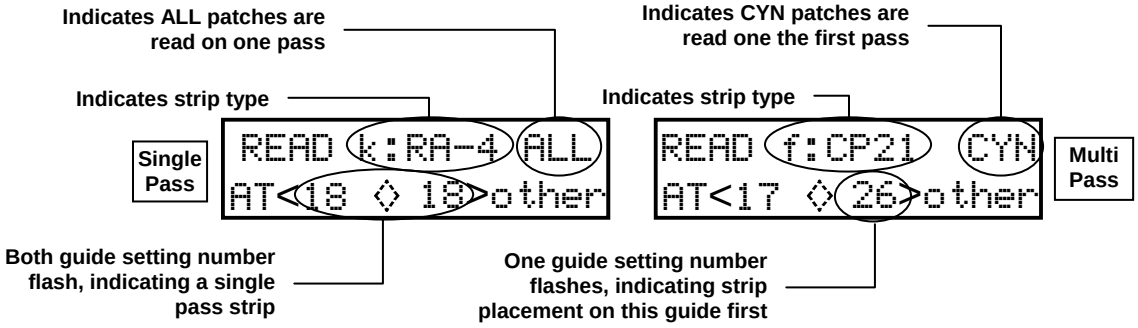
Supported strip definitions and strip insertion direction information is available in your Control Strip and Balance Print Format Guide shipped with your instrument.

Strip Information

- If a strip becomes “jammed” in your instrument during a measurement, simultaneously press key **III** and key **IIII** labeled “MENU.” This should cause the instrument to feed-out the strip. If this method does not work, slowly pull strip out from the front of the instrument.
- A strips is inserted into the instrument until it rests against the drive rollers.
- After a strip is initially inserted into the instrument, a one second delay occurs before the drive mechanism is activated to allow time for proper alignment.
- Due to the amount of variation in printer balance strips, no guide setting numbers appear in the display in the printer balance categories.
- Due to the configuration of the instrument drive mechanism, 16mm wide film control strips cannot be measured.
- The instrument does measure strips that are creased.

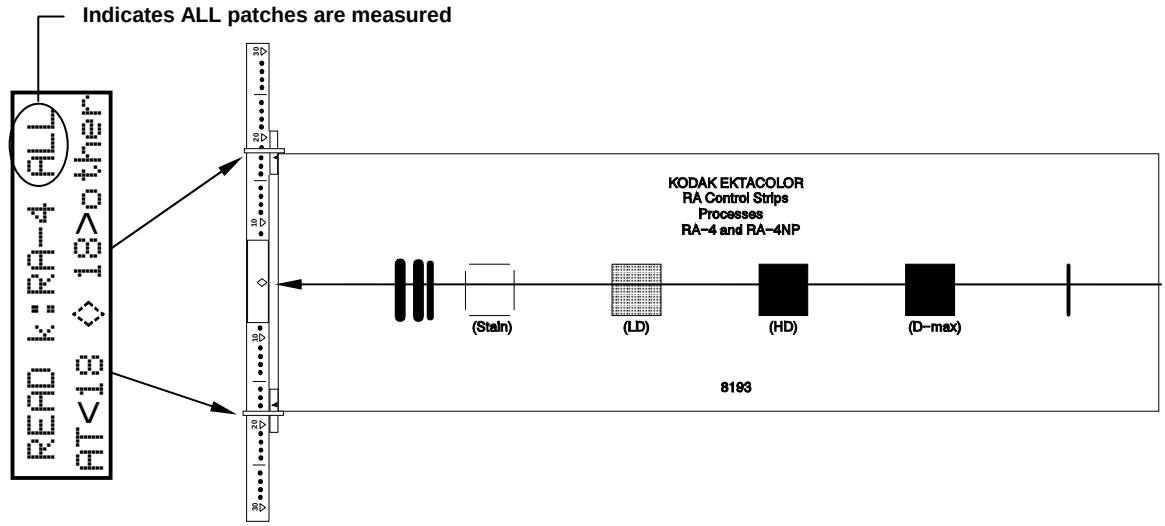
Paper Strip

When a particular paper strip is selected, one or both of the displayed paper guide setting numbers flash. If only one guide setting number is flashing, this indicates the guide that the strip rests on first when measuring. In most cases this only occurs on a strip that required multiple passes such as, Fuji CP-21. Both guide setting numbers flash on single pass strips.


Indicates ALL patches are read on one pass
Indicates CYN patches are read one the first pass
Indicates strip type
Indicates strip type
Single Pass
READ k:RA-4 ALL
AT<18 ◇ 18>other
READ f:CP21 CYN
AT<17 ◇ 26>other
Multi Pass
Both guide setting number flash, indicating a single pass strip
One guide setting number flashes, indicating strip placement on this guide first

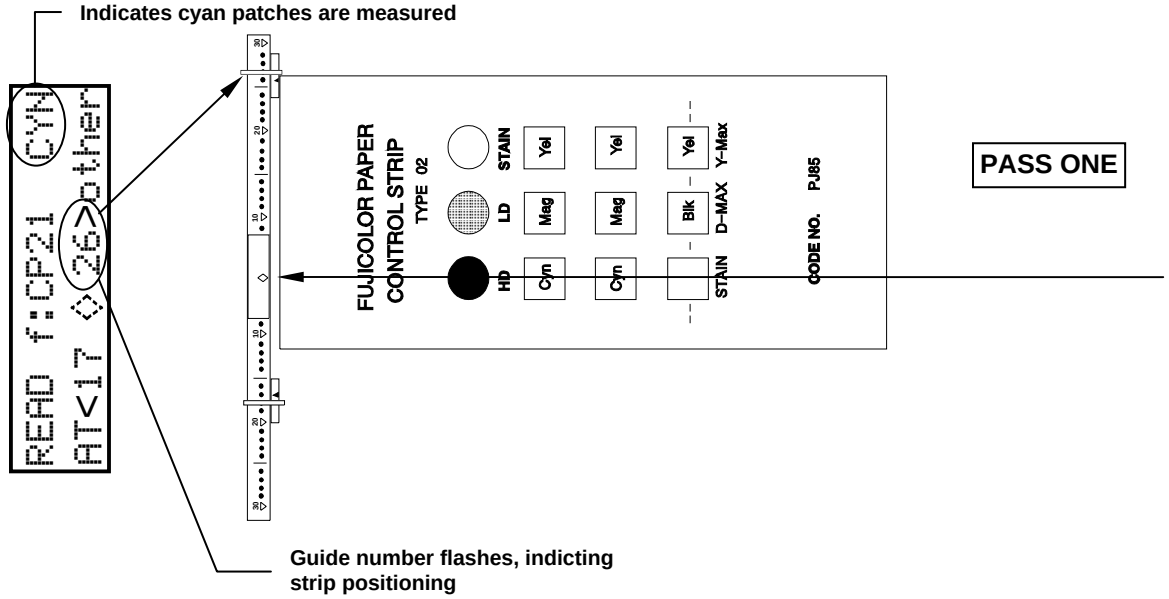
Single Pass

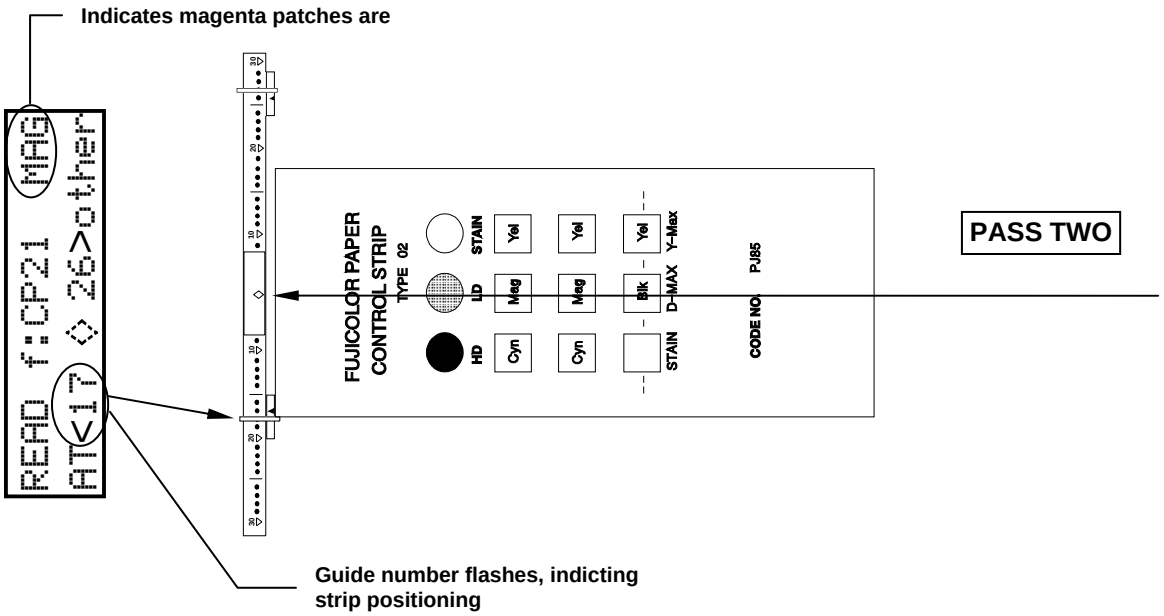
Single pass strips require the strip to be inserted into the instrument once. In this example, the strip—Kodak RA4—can be inserted in either direction. Refer to your Control Strip and Balance Print Format Guide for information on all strips supported.

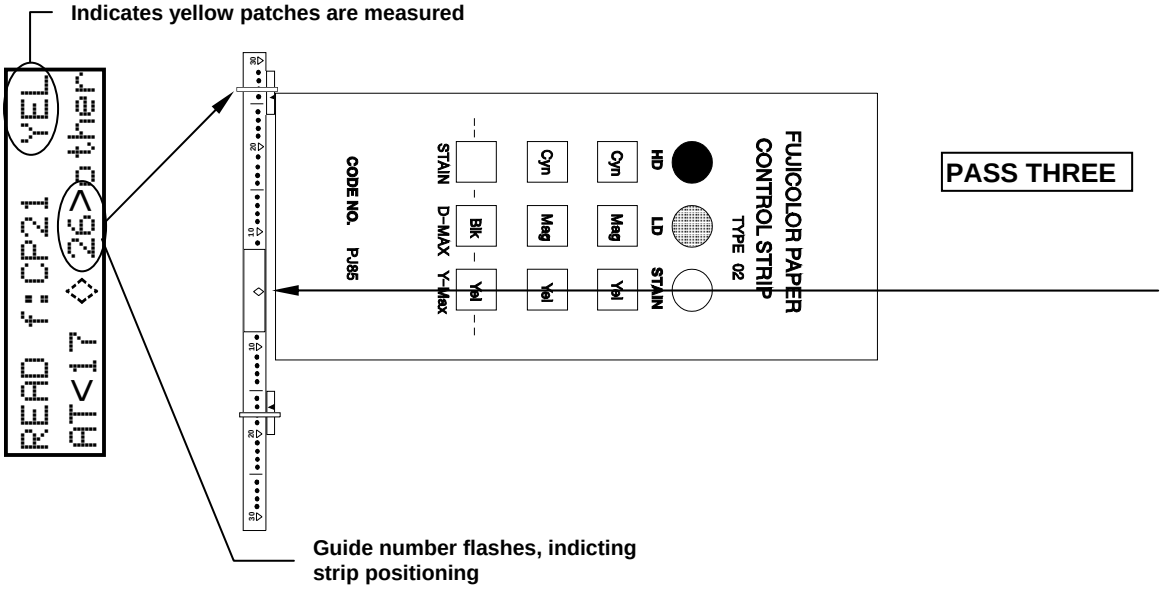


Multi Pass

Typically, a multi pass strip requires three pass through the instrument to obtain measurement data. The instrument displays what color patches are measured and what guide is used to insert the strip from.
In this example, the cyan—Fuji CP21—row of patches is measured first, followed by the magenta and yellow. Refer to your Control Strip and Balance Print Format Guide for information on strip insertion direction.



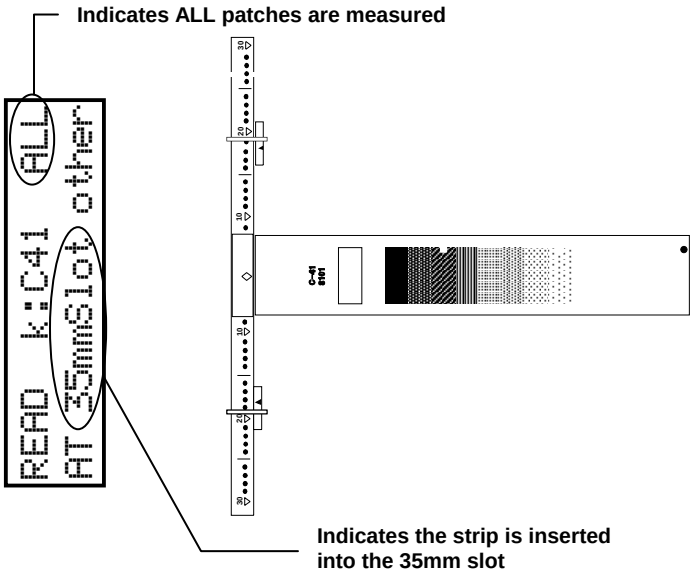




The third pass requires the strip to be rotated to take the measurement.

Film Strip

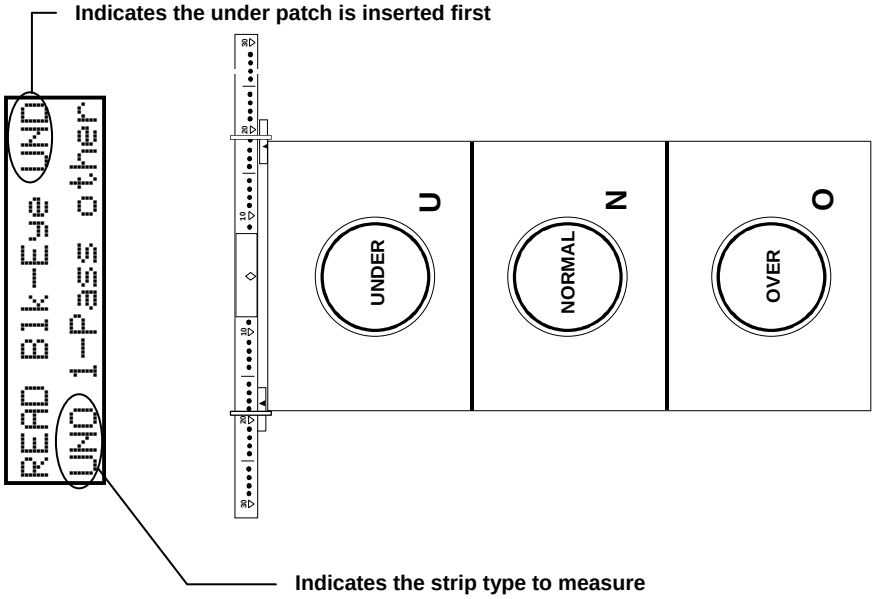
The Film category requires that the film strip be inserted into the 35mm slot located above the center diamond. In this example—Kodak C41—the strip can be inserted in either direction. Refer to your Control Strip and Balance Print Format Guide for information on all strips supported.



Printer Balance Strip

The Printer Balance category in the instrument has five basic strip formats: Wht-Eye, Blk-Eye, No-Ring, K:3510, and Small-BE. Each category has six print options to choose from. Refer to your Printer Balance and Control Guide for detailed information on all aspects of the printer balance strips. Due to the amount of variation between printer balance strips, no guide setting numbers appear in the display.

In this example—Blk-Eye, UNO 1-Pass—the Under patch is inserted first.



SECTION TWO

Instrument Calibration

This section covers the calibration procedures for your instrument.

Section Two Contents

- Calibration Information
- Auto Calibration Procedure
- Manual Calibration Procedure

CALIBRATION INFORMATION

The instrument has two types of calibration procedures available, automatic and manual. AUTO is the standard method of calibration. If you want your instrument to measure the same as another densitometer that has the same response, you would use the MANUAL procedure. When the instrument automatically calibrates, the density values are set precisely to that of the paper measured for reflection, and to no film (air) for transmission.

The instrument has many self checking algorithms built in to verify the accuracy of calibration. If you wish to maintain accuracy verification, we suggest that you obtain a C41 reference strip and a paper reference strip. Measure each strip and record the density values. Place the strips in an envelope and store them in a dry, cool environment. Periodically, measure them to verify accuracy. Note, reference strips tend to drift in density with time, consult the manufacturer's specifications for expected density changes.

If your Auto-Cal strip gets ruined or worn, you can order a replacement from X-Rite or your local dealer. Order Part Number 880-100.

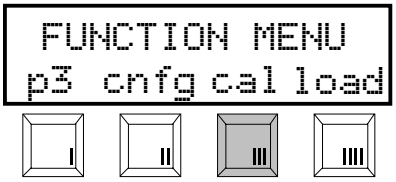
Frequency of Calibration

Under normal operating conditions, ***the instrument should be calibrated once a week*** or when instrument displays a message regarding calibration.

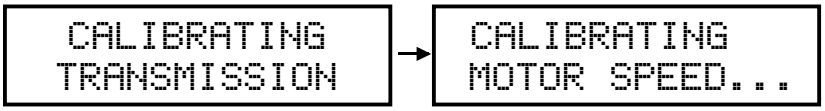
AUTO CALIBRATION PROCEDURE

NOTE: Make sure the Auto-Cal strip is free of dust, dirt, and smudgemarks. Refer to Section Eight for cleaning procedure. Handle cal strip by the edges.

1. Press key **III** (cal) located on Function Menu page (p3) to initiate calibration.

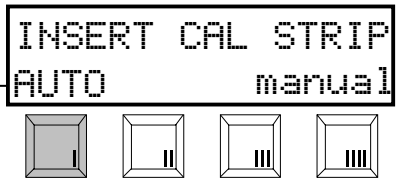


- The instrument screen momentarily displays **CALIBRATING TRANSMISSION** during automatic transmission calibration (reading air), and **CALIBRATING MOTOR SPEED.**

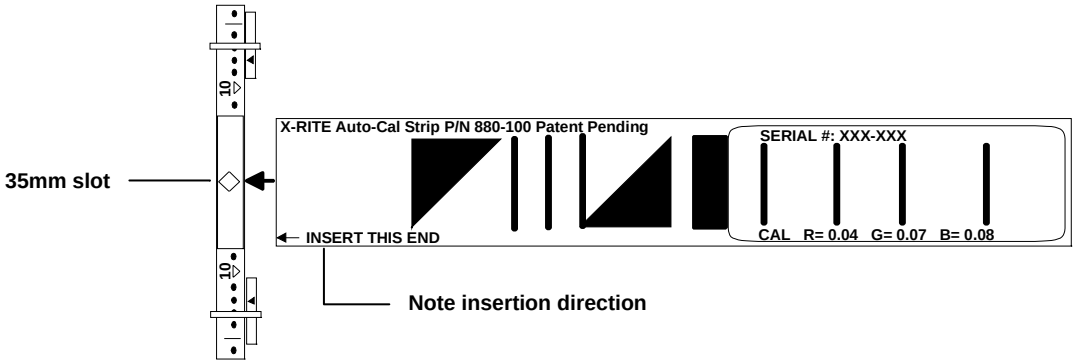


- After this is complete, the instrument screen asks you to **INSERT CAL STRIP**. Make sure the key labeled AUTO is upper-case lettering. If not, press key **I** (AUTO) to toggle to upper-case. Note, lower-case lettering denotes manual calibration (MANUAL) is activated.

Auto must be displayed in upper-case. If not, press key I to toggle on.



2. Insert the designated end of the Auto-Cal strip into the 35mm slot until it comes to rest against the drive rollers.



- **READING** is momentarily displayed on the screen followed by calibration density values. Auto calibration is now complete and the instrument screen returns to the Main menu.

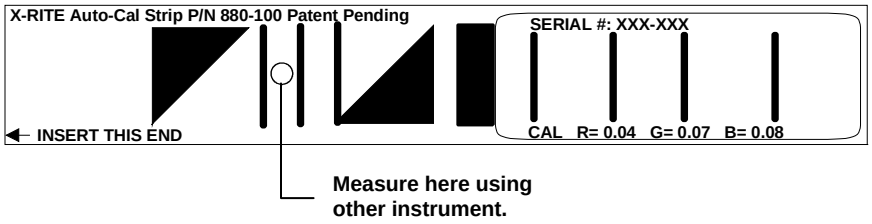
NOTE: If **UNRECOGNIZEABLE STRIP** momentarily appears on the screen when a cal strip is measured, the strip may be dirty—refer to Section Eight for procedure. However, if cleaning the strip does not resolve the problem, enter calibration manually then re-measure the strip.

MANUAL CALIBRATION PROCEDURE

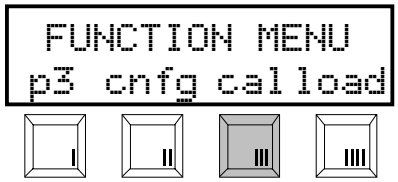
The manual calibration procedure is used to correlate the low densities of the instrument to another densitometer. Doing this allows the instrument to measure approximately the same as another densitometer that has Status A reflection response, and has been calibrated to ANSI Standards.

1. Using the instrument's own reference, calibrate the densitometer that you want this instrument to correlate with.

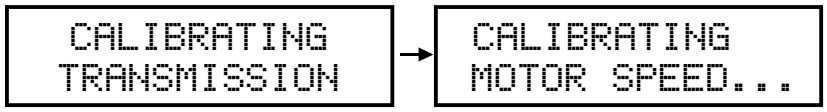
2. Using the same densitometer, measure the white area below the first black bar on the X-Rite Auto-Cal strip and record the Red, Green, and Blue values.


X-RITE Auto-Cal Strip P/N 880-100 Patent Pending
SERIAL #: XXX-XXX
INSERT THIS END
CAL R= 0.04 G= 0.07 B= 0.08
Measure here using other instrument.

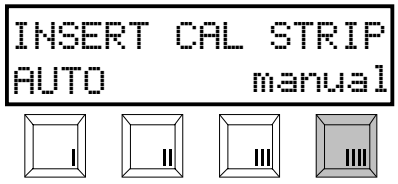
3. Press key **III** (cal) located on Function Menu page (p3) to initiate calibration.



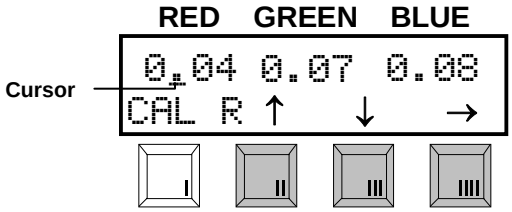
- The instrument screen momentarily displays **CALIBRATING TRANSMISSION** during automatic transmission calibration (reading air), and **CALIBRATING MOTOR SPEED.**



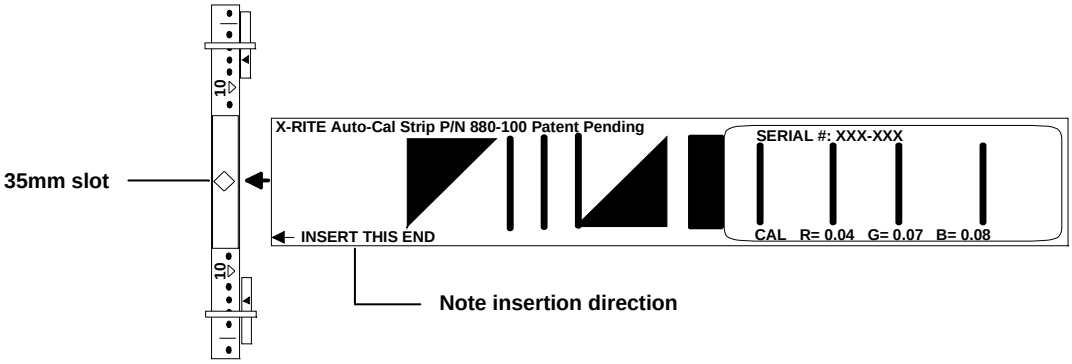
4. After this is complete, the instrument screen asks you to **INSERT CAL STRIP**. ***DO NOT INSERT STRIP AT THIS TIME.***
Press key **IIII** (manual) to advance to calibration reference values screen.



5. Enter the Red, Green, and Blue values you previously recorded into the designated fields. Press key **IIII** (→) to move the cursor to the desired location, and to advance to the next step after editing the values. Press key **II** (↑) to increase value and key **III** (↓) to decrease value.



6. **INSERT CAL STRIP** re-appears on the screen. Insert the designated end of the Auto-Cal strip into the 35mm slot until it comes to rest against the drive rollers.


35mm slot
X-RITE Auto-Cal Strip P/N 880-100 Patent Pending
SERIAL #: XXX-XXX
INSERT THIS END
CAL R= 0.04 G= 0.07 B= 0.08
Note insertion direction

- **READING** is momentarily displayed on the screen followed by calibration density values. Manual calibration is now complete and the instrument screen returns to the Main menu.

SECTION THREE

Setting System Configuration

The system configuration allows you to customize your instrument to meet your requirements. The configuration should be viewed and edited as needed before any measurements are taken.

Section Three Contents

- Instrument Configuration

INSTRUMENT CONFIGURATION

The configuration functions are contained in two main screen pages. Page one contains setup functions for instrument beeper tone, and network. Page 2 is broken down into five menu pages, four of which are submenus—p2a, p2b, and so on. Page two menus contain serial interface control options.

Descriptions for all configuration options are listed below, followed by set up procedures.

Page 1 Configuration Options

TONE
Use to adjust the instruments beeper volume. Available settings are: OFF, SOFT, and LOUD.

NET (Networking)
Enables the instrument to automatically send and receive data via the modem at a predetermined time that is selected by the QC computer. Available settings are: OFF, OUT, IN, and I&O.

- OFF - disables the instrument from automatically sending or receiving data.
- OUT - enables unit to *call out* via modem from QC host.
- IN - enables unit to *answer* incoming call on modem from QC host.
- I&O - enables both automatic transmission and reception of data.

Page 2 Configuration Options

IO preset

This options provides several QC system selections. All the necessary RS-232 interface parameters are automatically set when a predefined I/O preset is selected. A “CUSTOM” preset is available which allows you manually set all available I/O options. Below is a chart that contains all available I/O presets and their parameter settings.

NOTE: Certain parameters are mandatory for the I/ O preset and cannot be changed. They are labeled with an “L” for locked. Other parameters are not considered mandatory and are labeled with a “U” for unlocked. Finally, parameters that remain unchanged from previous settings—and can be changed—are shown as an asterisk (*).

I/O Preset	RCI	PIN5	XON	DPT	COMP	ALF	DEL	AXMT	BAUD
REPORT	Off	*	*	On (L)	On (L)	On (U)	Off (L)	Off (U)	*
SPRD-SHT	*	*	*	*	Off (L)	*	*	On (L)	*
k:TNetA	Off (L)	Off (L)	Off (L)	Off (L)	On (L)	On (L)	On (L)	On (L)	300(L)
k:TNetXT	Off (L)	CTS(L)	Off (L)	Off (L)	On (L)	On (L)	Off (L)	On (L)	*
K:C.A.P.	Off (L)	CTS(U)	Off (L)	Off (U)	On (U)	On (U)	Off (L)	On (L)	9600(L)
k:SYS25-75	Off (L)	CTS(L)	Off (L)	Off (L)	On (L)	On (L)	Off (L)	On (L)	*
f:TECOM	Off (L)	Off (L)	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	On (U)	1200(U)
c:I/O#1	On (L)	Off (L)	Off (L)	Off (U)	On (U)	On (U)	On (U)	On (L)	9600(L)
c:I/O#2	On (U)	Off (U)	Off (U)	Off (U)	On (U)	On (U)	On (U)	On (U)	9600(U)
MITSY#1	Off (U)	Off (U)	Off (U)	Off (L)	Off(L)	Off(L)	Off (U)	On (U)	300(L)
MITSY#2	Off (L)	Off (L)	On (U)	Off (L)	Off(L)	Off(L)	Off (L)	On (L)	300(U)
NORITSU	Off (L)	CTS(U)	Off (L)	Off (L)	On (L)	On (L)	Off (L)	On (L)	2400(U)
n:QSSnet	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	On (U)	2400(U)
n:Micro	*	*	*	*	*	*	*	*	*
kn:Net	TTL (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	Off (U)	Off (U)	2400(U)
a:LC2000	Off (U)	Off (U)	Off (U)	Off (U)	On (U)	On (U)	On (U)	On (U)	1200(U)
CUSTOM	#	#	#	#	#	#	#	#	#
Windense	On (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	Off (U)	On (U)	9600 (U)
Kodatel	On (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	Off (U)	On (U)	9600 (U)
Sienna	On (U)	Off (U)	Off (U)	On (U)	On (U)	On (U)	Off (U)	On (U)	4800 (U)

k: (Kodak), f: (Fuji), c: (Copal), kn: (Konica), n: (Noritsu), a: (Agfa)

Page 2a Configuration Options

RCI (Remote Control Interface)

Controls the ability of the instrument to be operated remotely. Available settings are: OFF, ON, TTL.

- OFF - sets the instrument into a receive mode at which time the instrument receives data.
- ON - enables data to be received via RCI command.
- TTL (Time Tagged Log) - causes all data received into the serial port to be placed into the log buffer with a time stamp.

PIN5

Determines the status of the handshaking input on Pin 5 of the RS-232 I/O port. Pin 5 may be interpreted as BUSY, CTS (clear-to-send), or OFF (ignored).

XON
When set to On (XON), this enables bi-directional transmit On/Off protocol. When set to Off (xon), the instrument ignores XON/OFF codes. Note, usage is limited to output at this point.

Page 2b Configuration Options

DPT (Decimal Point)
Controls the decimal point availability during data output. When off (dtp), no decimal is output with data. When on (DTP), decimal points are included with the output data.

COMP (Compact)
Varies the output format of the data. When off (comp), data for each color is delimited with a carriage return—or CR LF if ALF is enabled. When on (COMP), a space and delimiter is transmitted after each set of RGB data values.

ALF (Automatic Line Feed)
Controls the line feed availability during data output. When off (alf), no line feed is output with data. When on (ALF), a line is included with the output data.

Page 2c Configuration Options

DEL (Delay)
Controls a transmitted delay between each set if RGB data output. When off (del), no delay is sent between each set of RGB data. When on (DEL), a one second delay is sent between each set of RGB data.

AXMT (Automatic Transmit)
Controls automatic transmission of data after a measurement. When off (axmt), no data is transmitted out the I/O port after a measurement. When on (AXMT), data is automatically sent out the I/O after a measurement.

Page 2d Configuration Options

BAUD (Rate)
Determines the data output rate (characters per second) of the I/O port. Available settings are: 110, 300, 600, 1200, 2400, 4800, and 9600.

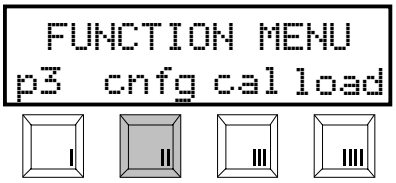
LOCK
Controls the ability to change the configuration options. When off (lock), configuration options are available for change. When on (LOCK), configuration options cannot be changed. Note, an additional step is required to change this option, refer to the following procedure for details.

Configuration Setup Procedure

- Options that toggle on and off display in upper-case (on) or lower-case (off). For example, COMP = on and comp = off.

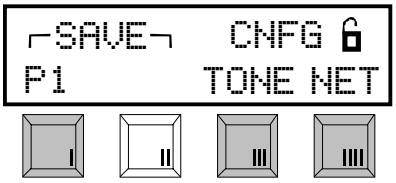
- You can save and exit the configuration at anytime without editing all options. This is accomplished by simultaneously pressing key **I** and key **II** when SAVE is displayed in the screen.
- Configuration can be exited at anytime without saving changes by simultaneously pressing key **III** and key **IIII** (MENU keys).

1. Press key **II** (cnfg) located on the Function Menu screen (p3) to enter Page1 Configuration screen.



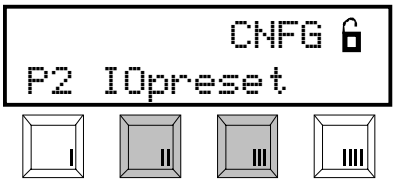
2. **Page 1 Configuration Screen**

- Press key **III** (TONE) to page through and select a beeper tone option (OFF, SOFT, and LOUD).
- Press key **IIII** (NET) to page through and select a networking option (OFF, OUT, IN, and I&O. *Note, only set if network modem is used.*
- After editing Page 1 Configuration options, press key **I** (P1) to advance to Page 2 Configuration screen.

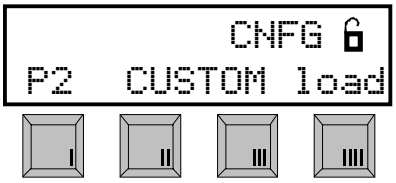


3. **Page 2 Configuration Screen**

- Press key **II** or key **III** (IOpreset) once to enter I/O preset menu.

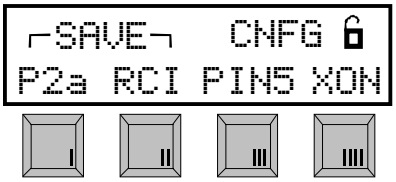


- Press key **II** or key **III** to page through and select a preset options (CUSTOM, REPORT, SPRD-SHT, k:TNetA, etc.).
- After selecting I/O preset option, press key **IIII** (P2) to load preset and advance to Page 2a Configuration screen.
- If you do not want to load a preset, press key **I** (P2) to advance to Page 2a Configuration screen.



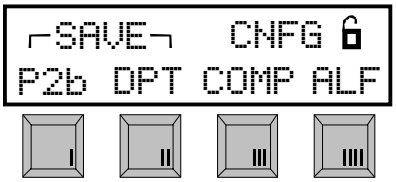
4. **Page 2a Configuration Screen**

- Press key **II** (RCI) to page through and select a remote control interface option (OFF, ON, TTL).
- Press key **III** (PIN5) to page through and select a handshake option (OFF, BUSY, and CTS).
- Press key **IIII** (XON) to select bi-directional transmit On/Off protocol option. Each key depression alternates between xon (off) and XON (on).
- After editing Page 2a Configuration options, press key **I** (P2a) to advance to Page 2b Configuration screen.



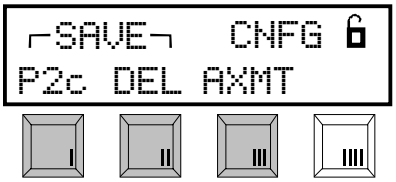
5. **Page 2b Configuration Screen**

- Press key **II** (DPT) to select decimal point output option. Each key depression alternates between dtp (off) and DPT (on).
- Press key **III** (COMP) to select data output format option. Each key depression alternates between comp (off) and COMP (on).
- Press key **IIII** (ALF) to select automatic line feed option. Each key depression alternates between alf (off) and ALF (on).
- After editing Page 2b Configuration options, press key **I** (P2b) to advance to Page 2c Configuration screen.



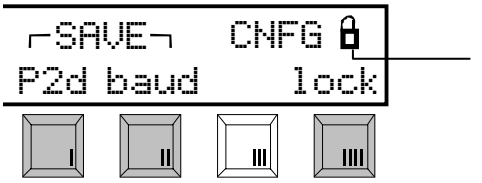
6. **Page 2c Configuration Screen**

- Press key **II** (DEL) to select delay option. Each key depression alternates between del (off) and DEL (on).
- Press key **III** (AXMT) to select automatic transmission option. Each key depression alternates between axmt (off) and AXMT (on).
- After editing Page 2b Configuration options, press key **I** (P2b) to advance to Page 2c Configuration screen.



7. **Page 2d Configuration Screen**

- Press key **II** (baud) to page through and select a baud rate option (300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600).
- Insert a piece of paper into the paper slot at least 1-¼" to activate the read switch—heavy paper or film works best. Press key **IIII** (lock) to select lock option. Each key depression alternates between lock (off) and LOCK (on). A "LOCK" selection (padlock icon closed) prevents any option changes from occurring .
- After editing Page 2d Configuration options, simultaneously press key **I** (P2d) and key **II** (baud) to save configuration settings. Pressing key **I** (P2d) alone causes Page 1 Configuration screen to reappear.



Padlock icon displays "closed" when options are locked.

SECTION FOUR

Strip Operation

It is important to make sure control strips and reference strips used are from the same batch number.

Always inspect control strips for damage before measuring. Care must also be taken when handing strips. Fingerprints on measurable patches can affect density values.

IMPORTANT! When inserting strips into the instrument, there should be at least a 30.5mm (1.25") leader before the outside edge of the first measurable target or the first target may not be detected. For information on measuring leaderless strips (30.5mm), refer to your Control Strip and Balance Print Format Guide, Section Five.

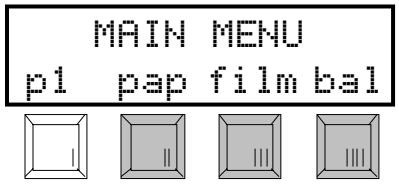
Section Four Contents

- Measuring Strips
- Manually Transmitting Strip Data

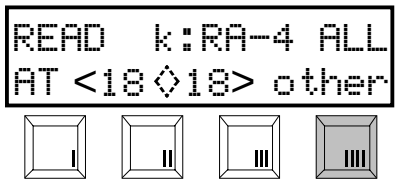
MEASURING STRIPS

Refer to your Control Strip and Balance Print Format Guide to located your control strip for proper insertion direction.

1. Select strip channel from Main Menu page 1.

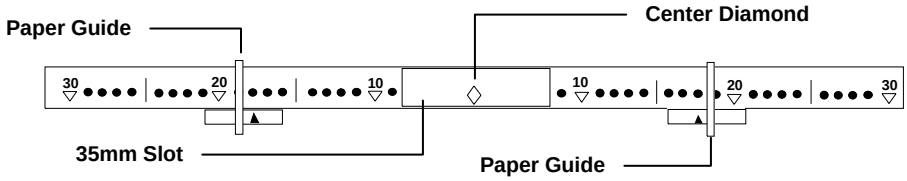


2. If format displayed is not correct, press key **IIII** (other) to select correct strip format.



3. **Measure strip**

- *For paper strips,* adjust the paper guides according to the number displayed on the screen. If multiple pass, note what color is to be measured first. Insert strip until it comes to rest against the drive rollers.
- *For film strips,* note insertion direction and insert strip into the 35mm slot until it comes to rest against the drive rollers.
- *For printer balance strips,* note insert direction and center bull's-eye over middle diamond. Slide paper guides next to strip and insert strip until it comes to rest against the drive rollers.



- The densitometer indicates that processing is taking place and the measurement status. If a paper strip is measured that has multiple passes, the display indicates the pass to insert.

```
  PROCESSING...
PASS #1 of 1 OK!
```

NOTE: If **INVALID READING, UNRECOGNIZABLE STRIP**, or **BUFFER OVERFLOW** messages display after a measurement, re-read strip. If the same message appears after re-reading strip, refer to Appendix B of this manual.

- Transmitting Data momentarily appears in the display screen (if auto transmit is enabled in Configuration Options), indicating measurement data is being transmitted out the I/O port.

```
  TRANSMITTING
      DATA
```

- The instrument screen displays the RGB measurement results. Refer to next page for procedure to view field results.

```
r.rr  g.gg  b.bb
Stain       exit
```

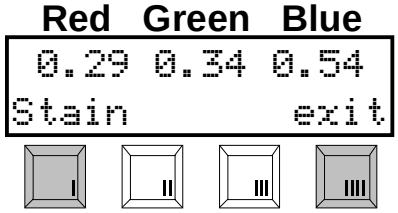
View Strip Data

Control strip data consists of the “actual” values measured by the instrument.

Control strip data is viewed after a strip measurement or by selection from the Main Menu (p2).

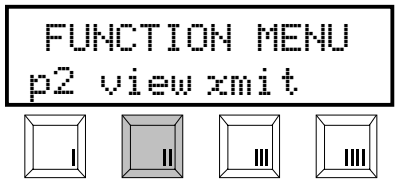
Viewing Data after Control Strip Measurement

1. Press key **I** (Stain) to page through RGB data fields of the strip.
2. After viewing data, press key **IIII** (exit) to exit.

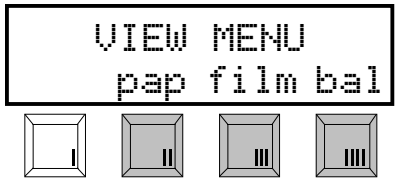


Viewing Control Strip Data from View Menu

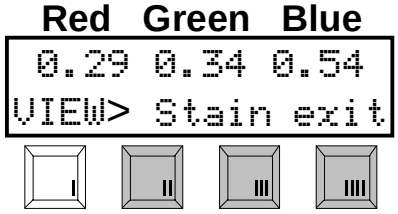
1. Press key **II** (view) located on Function Menu page (p2) to enter View Menu screen.



2. Press key **II** (pap), key **III** (film), or key **IIII** (bal) to select strip category.



3. Press key **II** or key **III** (Stain) to page through RGB data fields of the strip. After viewing data, press key **IIII** (exit) to exit to the View Menu, or simultaneously press key **III** and key **IIII** (MENU) to exit to the Main Menu.

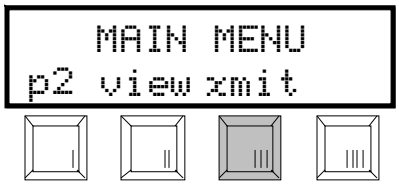


NOTE: CHANNEL IS EMPTY appears in the display if no control strip data is available to view.

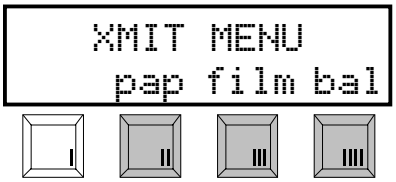
MANUALLY TRANSMITTING STRIP DATA

The manual transmit function allows you to transmit data for the last measurement taken in the paper, film, and printer balance categories.

1. Press key **III** (xmit) located on Main Menu page (p2) to enter Xmit Menu screen.



2. Press key **II** (pap), key **III** (film), or key **IIII** (bal) to select strip category.

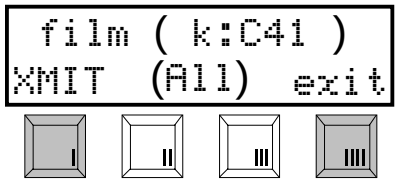


NOTE: CHANNEL IS EMPTY appears in the display if no control strip data is available in the selected channel.

---

3. Transmit strip data.

- Press key **I** (xmit) to transmit all strip data. ("xmit" changes to upper-case during transmission.)
- After transmitting data, press key **IIII** (exit) to exit to the Xmit Menu, or simultaneously press key **III** and key **IIII** (MENU) to exit to the Main Menu.



SECTION FIVE

Service and General Maintenance

This section covers repair information, cleaning, general maintenance, and troubleshooting tips for your instrument.

Section Five Contents

- Repair Information
- Cleaning the Instrument
- Replacing the Read Lamp
- Troubleshooting Tips

REPAIR INFORMATION

The X-Rite 890 is covered by a one-year limited warranty and should be referred to the factory or an authorized service center for repairs within the warranty period. Attempts to make repairs within this time frame may void the warranty.

X-Rite provides a factory repair service to their customers. Because of the complexity of the circuitry, all repairs should be referred to the factory or an authorized service center (call: 1-888-826-3044).

X-Rite will repair any 890 instrument past warranty. Shipping cost to the factory or authorized service center shall be paid by the customer, and the instrument shall be submitted in the original carton, as a complete unaltered unit.

CLEANING THE INSTRUMENT

Your instrument requires very little maintenance to achieve years of reliable operation. However, to protect your investment and maintain reading accuracy, a few simple cleaning procedures should be performed from time to time.

General Cleaning

Whenever required, the exterior of the instrument may be wiped clean with a cloth dampened in water or a mild cleaner.

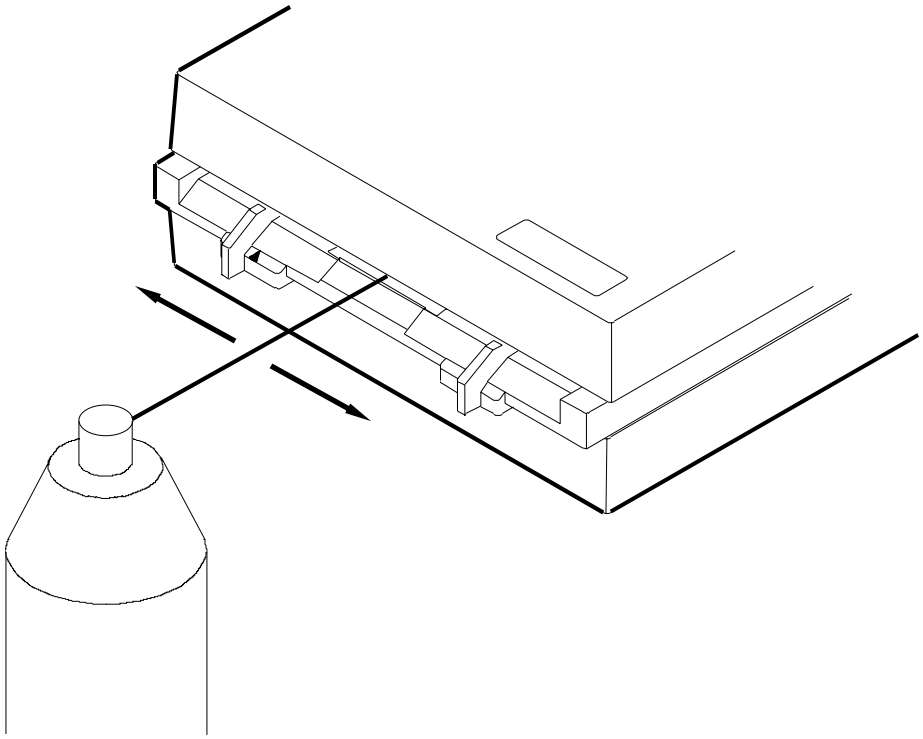
NOTE: *DO NOT* use any ketone solvents to clean the unit, this will cause damage to the cover.

Cleaning the Optics

The optics and drive wheel assembly should be cleaned once a week in normal environments, and more often in dirty or dusty environments.

1. Carefully lift instrument and insert tube from canned air into “front” strip insertion slot.
2. With back and forth motion, spray clean, dry air from one side to the other—do this several times. This should remove any accumulated dust and lint from the optics and wheel assembly.

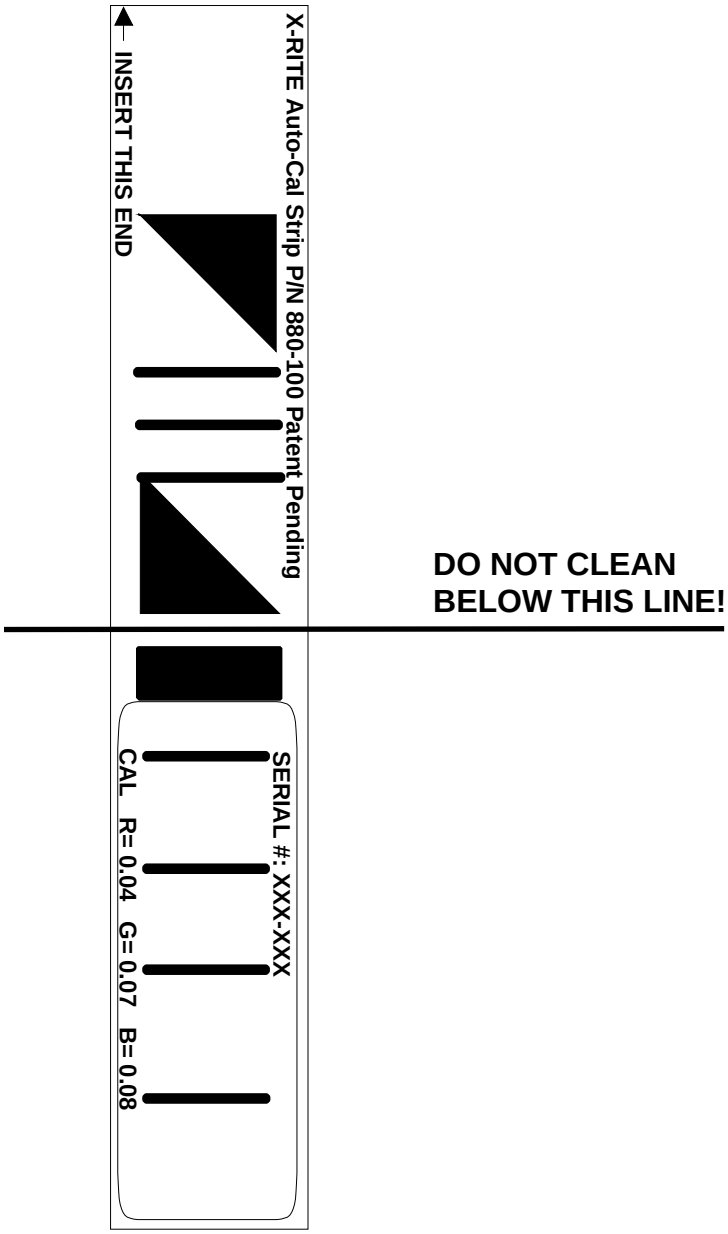
WARNING: DO NOT invert cans that use freon as a propellant, doing so could cause damage to the optics assembly.



Cleaning the Calibration Strip (Part Number 880-100)

The Auto-Cal strip can be cleaned with a mild soap detergent, and wiped dry with a clean, lint-free cloth. You must let the calibration strip dry completely before taking a calibration measurement.

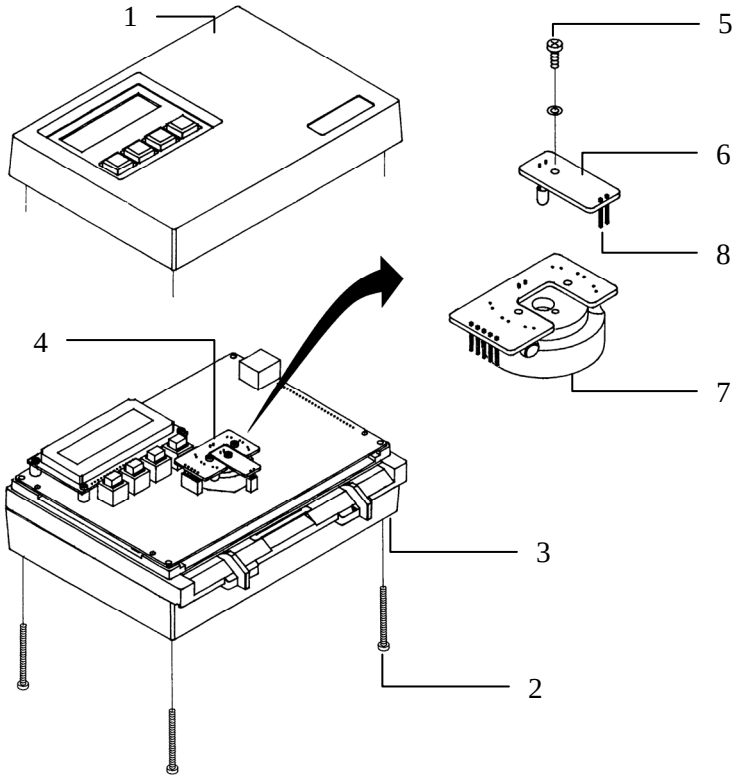
DO NOT clean below the bottom triangle. The attached label is not coated and smears when moisture is applied. **DO NOT** get fingerprints on any portion of the strip, handle by the edge.


INSERT THIS END
X-RITE Auto-Cal Strip P/N 880-100 Patent Pending
DO NOT CLEAN
BELOW THIS LINE!
SERIAL #: XXX-XXX
CAL R= 0.04 G= 0.07 B= 0.08

REPLACING THE READ LAMP (PART NUMBER 880-07)

NOTICE: New lamp may appear bent, **DO NOT** attempt to straighten.

1. Remove four screws (2) securing the bottom cover (3) with a phillips-head screwdriver. Leave bottom cover (3) on unit.
2. Holding top (1) and bottom (3) covers in place, turn unit over so it rests on the bottom cover (3). Remove top cover (1).
3. Locate optics assembly (4) and remove screw and washer (5) in the middle of lamp assembly P.C.B. (6).
4. Lift out old lamp assembly (6) and discard.
5. Install new lamp assembly (6) by carefully inserting lamp (6) into housing (7) and lamp pins (8) into lamp connector. Press down gently to make sure connector pins (8) are properly seated.
6. Secure lamp screw and washer (5) in place.
7. Carefully clean any dust or plastic chips off circuit board and top cover (1) using moisture free compressed air. Place top cover back on instrument.
8. Holding top and bottom covers in place, turn unit over so that it rests on top cover (1).
9. Remove bottom cover (3). Clean circuit board and bottom cover (3) with compressed air, then place bottom cover (3) back on instrument.
10. Secure bottom cover (3) to instrument with four screws (2) using a phillips-head screwdriver.



TROUBLESHOOTING TIPS

Reflection measurement incorrect:

- Recalibrate instrument.
- Clean reflection cal strip or replace if bad.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Transmission measurement incorrect:

- Recalibrate instrument.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Transmission and Reflection measurement incorrect:

- Recalibrate instrument.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Measurements drift:

- Recalibrate instrument.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Unit will not calibrate:

- Clean or replace cal strip.
- Read lamp not working.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Measurements unrepeatable/incorrect:

- Re-insert strip.
- Use different strip.
- Contact X-Rite or Authorized Service Center.

* The instrument has a failure monitor that in most cases automatically indicates when the read lamp requires replacement.

APPENDIX A

Technical Specifications

Transmission Process Control

Film Width	35mm fixed slot or 1.4–6.0in. adjustable
Measurement Speed	1.1 to 1.4 in./sec. (1.2 in./sec. typical)
Spectral Response	Status M
Density Range	0–4.0D
Density Accuracy	±.02D (0–3.0D), ±1% (3.1–3.4D) ±3% (3.5–4.0D)
Density Repeatability	±.01D (0–3.0D)
Control Strip Measurement Area	0.375” (length) x 0.5” (wide) minimum

Reflection (paper) Process Control and Printer Balance

Paper Width	1.4–6.0in. adjustable slot
Measurement Speed	1.3in./sec.
Control Strip Measurement Area	0.375” L x 0.5” W minimum
Printer Balance Measuring Area	0.75” diameter minimum
Spectral Response	Status A
Density Range	0–2.5D
Density Accuracy	±.02D
Density Repeatability	±.01D

General Specifications

AC Adapter	12VDC @ 0.7amp 115VAC (P/N SE30-61) 230VAC (P/N SE30-62)
Instrument Dimensions	7.2” W x 6.0” D x 2.75” H (182.8mm W x 152.4mm D x 69.mm H)

Specifications and design subject to change without notice.

APPENDIX B

Error Messages

Below is a list of typical error messages that can appear on your instrument's display screen. If any error messages listed, or not listed should appear, make a note of it and take the appropriate steps to try to correct it. If an error message is consistently displayed, contact X-Rite or an authorized service center.

Message	Reason	Possible Cause	Solution
INVALID READING - PLEASE RE-READ! or **UNRECOGNIZABLE STRIP** or **BUFFER OVERFLOW** (during measurement)	Unit did not recognize strip.	Wrong strip selection.	Select correct format.
		Strip did not have a 30.5mm (1.2") leader before first target.	Use strip with leader or refer to the Control Strip & Balance Print Format Guide for leaderless strip insertion.
		Strip not inserted in the correct direction.	Refer to your Control Strip and Balance Print Format Guide for insertion direction.
		Unit needs calibration	Calibrate instrument, Sec. 2.
		Measurement region not aligned with center diamond, or strip not tracking properly.	Make sure measurement patches are centered with diamond and center line. Usually setting the paper guides to the numbers indicated on the display takes care of the problem. Make sure strip feed straight through unit and does not curve toward one side.
		One or more measurement patches are cloudy, have excessive gradients, or have flecks.	Process and then measure a new strip.
		NOTE: If first read causes invalid error message, try re-reading strip again. Measurement tolerances across the patch are opened slightly on second read.	
		Motor drive roller slippage due to restraint or obstruction, or contamination of rollers from reading wet strips.	Remove restraint/obstruction or dry drive rollers with air.
		Lamp failure (weak or bad).	Perform transmission calibration to test lamp, Sec. 2.

Message	Reason	Possible Cause	Solution
UNRECOGNIZABLE AUTO-CAL STRIP! (during reflection cal)	Unit did not feed consistently.	Strip inserted in backwards or upside-down.	Insert strip correctly, Sec. 1.
		Cal strip is dirty.	Clean cal strip, Sec. 8.
STRIP RESTRAINED RE-INSERT STRIP! (during reflection cal)	Cal strip did not feed consistently.	Strip path is blocked by debris keeping cal strip from feeding properly.	Clean strip path, Sec. 8.
		Motor drive roller slippage due to restraint or obstruction, or contamination of rollers from reading wet strips.	Remove restraint/obstruction or dry drive rollers with air. IF problem persists, return unit for service.
WARNING MOTOR ERROR! (during reflection cal)	Unit senses motor abnormality.	Strip was pulled out from back during calibration.	DO NOT pull on strip during measurement.
		Motor brush wear.	Return unit for service.
		NOTE: If motor error message constantly displays, unit should be returned for proper service.	
PRESET MEMORY PLEASE CALIBRATE (during power-up)	Memory data detected in unit is not valid.		Recalibrate unit, Sec. 2.
WARNING LAMP MARGINAL! (during trans cal)	Lamp output is less than 50% of its peak intensity (but still able to read).	Lamp has aged close to end of its useful life.	Order new lamp. Replace at convenient time.
WARNING REPLACE LAMP (during trans cal)	Lamp output is less than required intensity. Measurement accuracy of unit is questionable at this point.	Useful lamp life has expired.	Replace lamp immediately, Sec. 8.

APPENDIX C

Term Abbreviations

ALF	Automatic Line Feed
ALL	Strip is one pass and may be read in either direction (strip measurement mode)
AXMT	Automatic Transmit
bal	Printer Balance
baud	Varies unit of data transmission speed.
BLK	Black patch must be read first (strip measurement mode)
cal	Calibration
c:I/O#1	Copal, I/O #1
c:I/O#2	Copal, I/O #2
cnfg	Configuration
COMP	Compact
CTS	Clear to Send
CYN	Cyan patch must be read first (strip measurement mode)
def	Default
del	Delete
DEL	Delay (in configuration)
DPT	Decimal Point
f:TECOM	Fuji, Tecom System
HD	High Density patch must be read first (strip measurement mode)
k:C.A.P.	Kodak, Create a Print
k:SYS $^{2}_{5}\rightarrow^{7}_{5}$	Kodak, Systems 25 through 75
k:TNetA	Kodak, Technet A
k:TNetXT	Kodak, Technet XT
LANG	Language
MIN	Minimum Density patch must be read first (strip measurement mode)
NRM	Normal patch must be read first (strip measurement mode)
NUO 1-Pass	Normal/Under/Over in 1 pass
pap	Paper
PIN5	Pin5 of RS232 port can be set to Off, Busy, or CTS
p1 through p3	Page #1 through Page #3
p2a through p2d	Page #2a through Page #2d

Q.C.	Quality Control
RCI	Remote Control Interface
SPRD-SHT	Spread Sheet
UND	Under patch must be read first (strip measurement mode)
UNO 1-Pass	Under/Normal/Over in 1 pass
UNO 3-Pass	Under/Normal/Over in 3 passes
xmit	Transmit
YEL	Yellow patch must be read first (strip measurement mode)
↑	Increase amount
↓	Decrease amount
→	Advances cursor

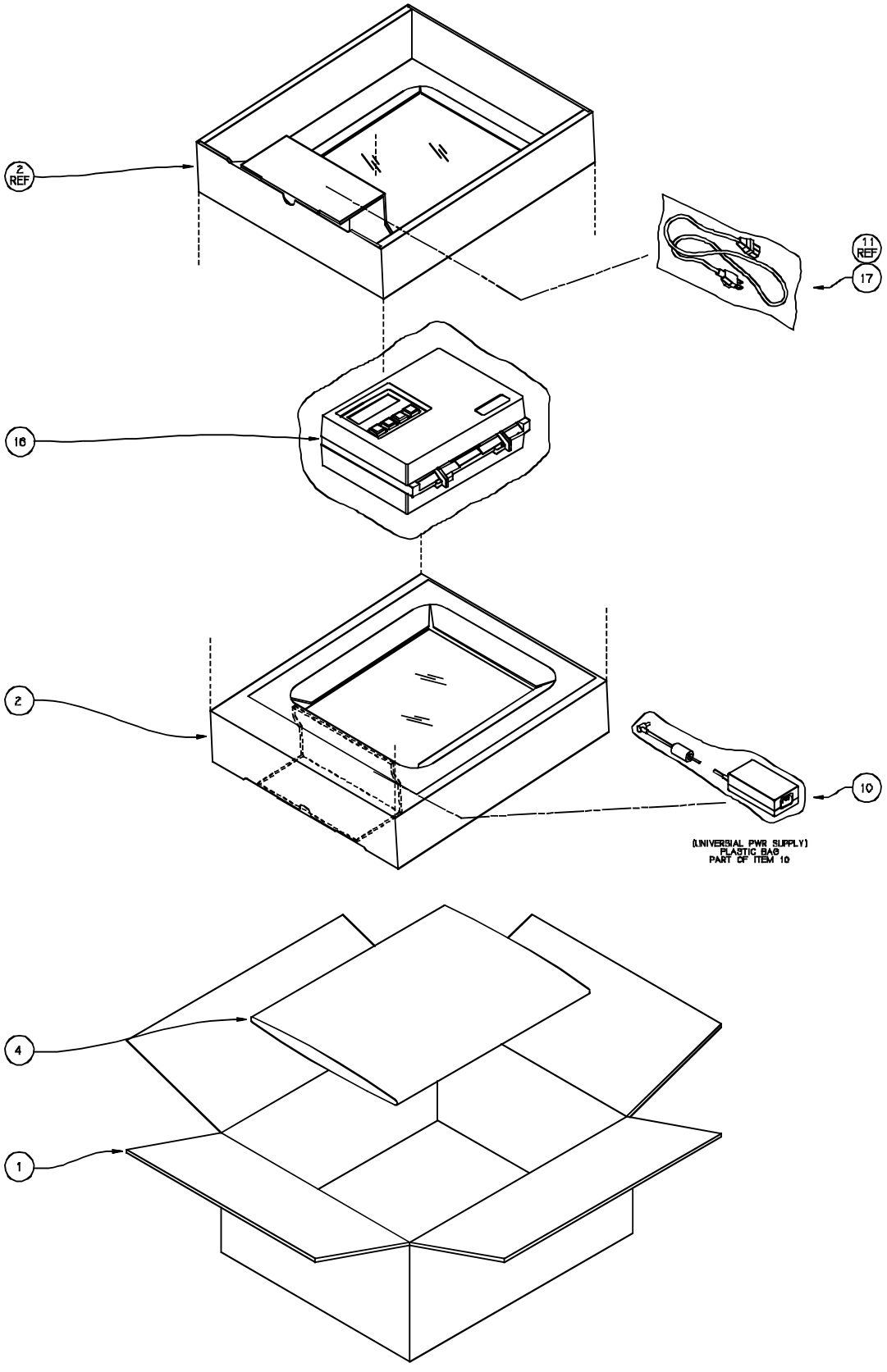
APPENDIX D

Parts List and Packaging Drawings

Parts List

18	-	-	NOT USED	
17	-	1	SD33-08	LINE CORD
	1	-	SD33-07	LINE CORD
16	1	1	890U-00-01	PHOTOGRAPHIC SCANNING DENSITOMETER ASSY
15	-	-	NOT USED	
14	-	-	NOT USED	
13	-	-	NOT USED	
12	-	-	NOT USED	
11	1	1	SD65-13	PLASTIC BAG
10	1	1	SE30-77	POWER SUPPLY, 12V - SWITCHING
9	-	-	NOT USED	
8	-	-	NOT USED	
7	-	-	NOT USED	
6	-	-	NOT USED	
5	-	-	NOT USED	
4	1	1	890U-900	DOCUMENTATION PACKAGE
3	-	-	NOT USED	
2	2	2	SD200-880-06	CARTON INSERT
1	1	1	SD200-880-01	CARTON
ITEM	QTY 890U	QTY 890UX	PART NUMBER	DESCRIPTION
PARTS LIST				

Packaging Drawing



APPENDIX E

890 Instrument Firmware Update

The instrument's firmware is upgraded using Interface Cable P/N SE108-70 and DB Adapter P/N 881-71, both available from X-Rite.

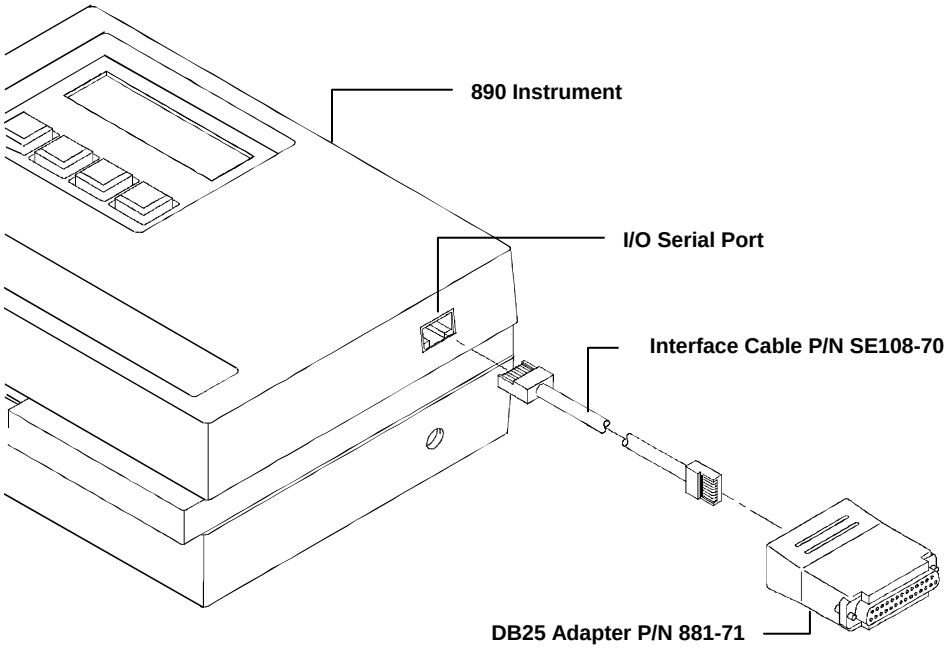
The following items are required to perform a 890 instrument firmware update:

- Computer with an available serial port
- 890 instrument with AC adapter
- Update firmware disk
- Interface cable (P/N SE108-70) and DB25 adapter (P/N 881-71)

NOTE: Computer screen savers must be disabled during the update procedure. Once the update has been started, the old firmware version is permanently erased.

Step 1 Cabling Connection Procedure

- Insert one end of the interface cable P/N SE108-70 into the I/O port on the instrument. Modular connector only inserts in one direction.
- Insert the other end of the interface cable into the DB25 Adapter P/N 881-71.
- Attach the DB25 adapter to an available "RS-232" I/O port on the computer.



Step 2 Setting Instrument to Receive Update

- Apply AC power to the instrument.

NOTE: Make sure modem baud is set to "57.6K." To check baud, from P3 Function menu, press "Load" key, and then press "cfg" key. Next press "mod" key, and then press "baud" key. Adjust baud rate if required.

- Enter the **Load Menu** by pressing key **ll** (netwk) on page 3 (p3) **Function Menu**.
- Press key **lll** (load), **Waiting for Host** is displayed.

Step 3 Firmware Update Procedure

If you are running DOS under Windows 3.*x*, you may need to exit Windows to run the Loader program reliably. You can open an MS DOS window using Win95 or NT.

- Insert 3-1/2" Update disk into your computer 3-1/2" drive.
- Change DOS prompt to appropriate drive (A or B).
- Type: **89X** and press **[ENTER]** key. The program now establishes communication with the instrument and begins update.
- After the firmware is updated the unit goes through a normal startup routine.
- Firmware update is now complete, remove disk and cabling.

Main Menu Fail Message

A Main Menu Fail message will appear on the instrument display if an interruption in communication occurred during the update. Possible cause for this message is a power failure, cabling disconnect, etc. When this occurs, the instrument can only be set to the **Waiting for Host** mode from the **Loader** menu. Refer to procedure that follows.

- From the **Main Menu Fail** display, press key **llll** (ok). The instrument displays the **Loader** menu.
- Press key **lll** (load) and then press key **llll** (recv) on **Select Function** menu. **Waiting for Host** is re-displayed on the instrument.
- Continue with Step 3.

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P/N 890-500 Rev. N